

## **What is claimed is:**

- [Claim 1]** 1. A method for operating a vehicle, the method comprising:  
applying a test signal to a vehicle electric power component;  
generating a response from the component;  
determining an operating state of the component based at least in part on the response to the signal; and  
controlling vehicle operation based at least in part on the determined operating state of the component.
- [Claim 2]** 2. The method of claim 1, wherein controlling vehicle operation includes implementing a limited vehicle operating strategy based at least in part on detecting a degrading state for the component.
- [Claim 3]** 3. The method of claim 1, wherein controlling vehicle operation includes preventing further operation of the component.
- [Claim 4]** 4. The method of claim 1, wherein controlling vehicle operation includes indicating a degrading state of the component on a display.
- [Claim 5]** 5. The method of claim 1, wherein applying the test signal includes applying the signal to determine a forward-on voltage drop of the component.
- [Claim 6]** 6. The method of claim 1, wherein applying the test signal includes shutting off at least one other component and applying the signal to test for a leakage current in the component.
- [Claim 7]** 7. The method of claim 1, wherein applying the test signal includes applying the signal to determine a thermal impedance of the component.
- [Claim 8]** 8. The method of claim 1, wherein applying the test signal includes applying the signal to determine an AC impedance of the component.
- [Claim 9]** 9. The method of claim 1, wherein determining the response includes developing a response trend based on a number of responses, comparing the

response trend to a predefined trend, and determining the state of the component based in part on the comparison.

**[Claim 10]** 10. The method of claim 9, wherein the state of the component indicates a need to limit degradation if the response trend differs from the predefined trend by a predefined margin.

**[Claim 11]** 11. The method of claim 1, wherein the vehicle includes an inverter for powering a motor and the component is the inverter, and wherein controlling vehicle operation includes limiting operation of the motor if the diagnosed state of the inverter indicates the inverter is degrading.

**[Claim 12]** 12. The method of claim 1, wherein the vehicle includes an inverter for powering a power steering unit and the component is the inverter, wherein controlling vehicle operating includes limiting operation of the power steering unit if the determined state of the inverter indicates the inverter is degrading.

**[Claim 13]** 13. The method of claim 1, wherein the vehicle includes an inverter for powering an air conditioning unit and the component is the inverter, and wherein controlling vehicle operation includes limiting operation of the air conditioning unit if the diagnosed state of the inverter indicates the inverter is degrading.

**[Claim 14]** 14. The method of claim 1, wherein the vehicle includes an auxiliary DC/DC converter and the component is the auxiliary DC/DC converter, wherein controlling vehicle operating includes limiting operation of the auxiliary DC/DC converter if the determined state of the auxiliary DC/DC converter indicates the auxiliary DC/DC converter is degrading.

**[Claim 15]** 15. The method of claim 1, wherein the vehicle includes an inverter for powering a fan/radiator unit and the component is the inverter, and wherein controlling vehicle operation includes limiting operation of the fan/radiator unit if the determined state of the inverter indicates the inverter is degrading.

**[Claim 16]** 16. The method of claim 1, wherein the vehicle includes a DC/DC converter that receives power from a fuel cell and a high voltage battery and that outputs power on a high voltage bus for powering the vehicle, wherein the component is the DC/DC converter, and wherein controlling vehicle operation includes limiting

operation of the DC/DC converter if the determined state of the DC/DC converter indicates the DC/DC converter is degrading.

**[Claim 17]** 17. The method of claim 1, wherein the vehicle includes a fuel cell and an inverter for powering a fuel cell air compressor and the component is the inverter, wherein controlling vehicle operating includes limiting operation of the fuel cell if the determined state of the inverter indicates the inverter is degrading.

**[Claim 18]** 18. The method of claim 1, wherein the vehicle includes a fuel cell and an inverter for powering a fuel cell water pump and the component is the inverter, wherein controlling vehicle operation includes limiting operation of the fuel cell if the determined state of the inverter indicates the inverter is degrading.

**[Claim 19]** 19. A system for controlling operation of an electronic power component of a vehicle based at least in part on a determined state of the vehicle component, the system comprising:

a prognostic module to diagnose the state of the vehicle component by providing a test signal thereto and determining a degrading state of the tested component based at least in part on a response of the tested component to the test signal if the determined state is degrading faster than a predefined degradation rate; and

a vehicle system controller for controlling operation of the vehicle, the vehicle system controller being operable with the prognostic module to limit vehicle operation in response to detection of a degrading state of the tested component.

**[Claim 20]** 20. The system of claim 19 wherein the prognostic module test one of an inverter and a DC/DC converter.